PATENT APPLICATION
Attorney Docket No. D/99262

RESOURCE MANAGEMENT FOR A PRINTING SYSTEM VIA JOB TICKET

Attention is directed to copending applications Attorney Docket Number D/98736, U.S. Patent Application Serial No. ----------, filed ----------, entitled, "USER INTERFACE FOR NAVIGATION AND CONTROL OF A PRINTING SYSTEM" and Attorney Docket Number D/99317, U.S. Patent Application Serial No. ----, filed----, entitled OPERATOR NOTATION TOOL TIP". The disclosures of these applications are hereby incorporated by reference in their entirety.

FIELD OF THE INVENTION

The present invention relates to a printing system, and more particularly to a resource management using job tickets displayed on a user interface for controlling a printing system to generate documents received from one or more input units including a computer network, scanner, modem, etc.

BACKGROUND OF THE INVENTION

Present and future high capacity printing systems are intended to provide an operator or user with as many job programming options and selections as reasonably possible. For example, at least four developer housings containing four different types of toner are utilized to provide color copying. Further, operators wish to choose from a very large variety of stock. Stock is the print media or support material on which prints are made. The number of print media choices is very large considering the great number of different sheet sizes, colors, and types that are used by customers today.

The number is even larger due to the printing needs of different foreign countries.

Since the operator or user wishes to offer a wide variety of printing options to customers and complete customer orders as quickly as possible, minimizing the interruption of print jobs is a very important priority. By replenishing supplies such as stock and toner in a timely fashion, the utilization of high capacity printing systems can be maximized.

A large amount of information concerning the status of the current print job and the requirements of requested print jobs, which have not yet been performed, is required to maximize the utilization of the printing system. In order for the operator to more efficiently utilize the printing system to perform a large number of print jobs with as few interruptions as possible, there is a need for user friendly tools, which can provide the operator with information to manage and supply resources including printing supplies to the printing system in a timely manner.

SUMMARY OF THE INVENTION

A graphical user interface for providing job tickets and print job information on a display screen for a printing system, comprising: a depiction of a pathway access window including a print queue icon; a depiction of a printer status window including a printer icon; a display unit displaying a job ticket for each print job by selecting the print queue icon, each job ticket is associated with a job ticket icon indicating whether there are sufficient resources to complete the print job associated with the job ticket; and the display unit displaying print job information associated with each job ticket by selecting one of the job ticket icons. The print job information comprises at least one of the following types of information required stock information, required finishing information, and required resources information.

The pathway access window further comprises a print engine icon and the display unit displays print engine information by selecting the print engine icon. The print engine information includes toner levels in the printing system and the display unit displays an insufficient resources icon when there is insufficient toner to complete one of the print jobs.

The printer icon includes a depiction of the print engine and the display unit displays print engine information by selecting the depiction of the print engine. The print engine information includes toner levels in the printing system and the display unit displays an insufficient resources icon when there is insufficient toner to complete one of the print jobs.

The printer status window further comprises a multiuse job progress indicator, including total time, elapsed time and time remaining for a current print job.

A printing system for printing image data received from a computer network, scanner or other image data generating device on a support material, comprising a supply unit having a plurality of feeders, wherein each feeder has at least one tray for storing support material; a controller including: a system controller processing the received image data, and a user interface comprising: a print queue icon, a plurality of job tickets, and print job information displayed on the display screen by selecting one of the job tickets; a print engine including: a charging unit charging a surface of a photoconductive belt, a first exposure unit exposing a photoconductive belt to create an electrostatic latent image based on the received image data at the direction of the system controller, a first developer unit having first color charged toner particles, which are attracted to the electrostatic latent image, a second exposure unit exposing the photoconductive belt based on the received image data at the direction of the system controller, a second developer unit having second color charged toner particles, which are attracted to the electrostatic latent image, a third exposure unit exposing the photoconductive belt based on the received image data at the direction of the

system controller, a third developer unit having third color charged toner particles, which are attracted to the electrostatic latent image, a fourth exposure unit exposing the photoconductive belt based on the received image data at the direction of the system controller, a fourth developer unit having fourth color charged toner particles, which are attracted to the electrostatic latent image, a transfer unit receiving support material and transferring the toner from the photoreceptor belt to the support material,

a fuser assembly receiving the support material from the transfer unit and permanently affixing the toner to the sheet of support material, and a cleaning unit cleaning the photoreceptor belt; and a finishing unit, coupled to the print engine, the finishing unit comprising at least one of a stacker, binder, stapler and inserter.

In one embodiment, the fist color charged toner particles are magenta, the second charged toner particles are yellow, the third charged toner particles are cyan and the fourth charged toner particles are black.

The print job information includes required stock information, required finishing information and required resources information. The user interface further comprises a print engine icon actuated to display print engine information. The print engine information includes current toner levels, and the amount of toner required to complete print jobs based on the requirements in the print job tickets.

A printing system for printing image data received from a computer network, scanner or other image data generating device on a support material, comprising: a supply unit having a plurality of feeders, wherein each feeder has at least one tray for storing support material; a controller including: a system controller processing the received image data, and a user interface comprising: a print queue icon, a plurality of job tickets, and print job information displayed on the display screen by selecting one of the job tickets; a print engine including: a charging unit charging a surface of a photoconductive belt, at least one exposure unit exposing a photoconductive

belt to create an electrostatic latent image based on the received image data at the direction of the system controller, at least one developer unit having charged toner particles, which are attracted to the electrostatic latent image, a transfer unit receiving support material and transferring the toner from the photoreceptor belt to the support material, a fuser assembly receiving the support material from the transfer unit and permanently affixing the toner to the sheet of support material, and a cleaning unit cleaning the photoreceptor belt; and a finishing unit, coupled to the print engine, the finishing unit comprising at least one of a stacker, binder, stapler and inserter.

In one embodiment, the fist color charged toner particles are magenta, the second charged toner particles are yellow, the third charged toner particles are cyan and the fourth charged toner particles are black.

The print job information includes required stock information, required finishing information and required resources information. The user interface further comprises a print engine icon actuated to display print engine information. The print engine information includes current toner levels, and the amount of toner required to complete print jobs based on the requirements in the print job tickets.

A method for managing resources for print jobs, comprising: displaying print job tickets in print queue; identifying print job information necessary to complete print jobs based on contents of print job tickets; prompting modules for resource status information; receiving resource status information from modules; comparing resource status information to print job information for each job ticket; displaying first icon indicating that resources are available to complete print jobs for job tickets, where resources are sufficient; and displaying second icon indicating that resources are unavailable to complete print jobs for job tickets, where resources are insufficient. The print job information includes required stock information, required finishing information, and required resource information.

The method for managing resources further comprising displaying available and required stock information. The method for managing resources further comprising displaying available and required finishing information. The method for managing resources further comprising displaying available and required resource information. The method for managing resources for print jobs further comprising displaying available and required print engine information.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a digital printing system into which the preferred embodiments may be incorporated;

Figure 2 is a general block diagram of the printing system shown in **Figure 1**;

Figure 3 is a general diagram of a few of the components of the user interface shown in **Figure 2**;

Figure 4 is a view depicting an exemplary graphical representation of printer status window and pathway access window displayed on a user interface screen of the printing system shown in **Figures 1 and 2**;

Figure 5 is a view depicting an exemplary graphical representation of print engine settings and supplies displayed on a user interface screen of the printing system shown in **Figures 1 and 2**;

Figure 6 is a view depicting an exemplary graphical representation of print engine consumables displayed on a user interface screen of the printing system shown in **Figures 1 and 2**;

Figure 7 is a view depicting an exemplary graphical representation of print queue displayed on a user interface screen of the printing system shown in **Figures 1 and 2**;

Figure 8 is a view depicting an exemplary graphical representation of required stock information displayed on a user interface screen of the printing system shown in **Figures 1 and 2**;

Figures 9-10 are views depicting an exemplary graphical representation of required finishing information displayed on a user interface screen of the printing system shown in **Figures 1 and 2**;

Figure 11 is a view depicting exemplary graphical representation of required resources information displayed on a user interface screen of the printing system shown in **Figures 1 and 2**;

Figures 12-13 are flow charts showing the management resource process; and

Figure 14 is a partial schematic elevational view of an example of a printing system employing the user interface of the present invention.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

While the present invention will hereinafter be described in connection with a preferred embodiment thereof, it will be understood that it is not intended to limit the invention to that embodiment. On the contrary, it is intended to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention as defined in the appended claims.

Figure 1 shows a digital printing system **10** of the type suitable for use with the preferred embodiment for processing print jobs. As shown, the digital printing system includes document feeders **20**, a print engine **30**, and finishers **40** and controller **50**. The digital printing system **10** is coupled to an image input section **60**.

As shown in **Figure 2**, the image input section **60** transmits signals to the controller **50**. In the example shown, image input section **60** has both remote and onsite image inputs, enabling the digital printing system **10** to

provide network, scan and print services. In this example, the remote image input is a computer network **62**, and the onsite image input is a scanner **64**. However, the digital printing system **10** can be coupled to multiple networks or scanning units, remotely or onsite. Other systems can be envisioned such as stand alone digital printing system with on-site image input, controller and printer. While a specific digital printing system is shown and described, the present invention may be used with other types of printing systems such as analog printing systems.

The digital printing system **10** can receive image data, which can include pixels, in the form of digital image signals for processing from the computer network **62** by way of a suitable communication channel, such as a telephone line, computer cable, ISDN line, etc. Typically, computer networks **62** include clients who generate jobs, wherein each job includes the image data in the form of a plurality of electronic pages and a set of processing instructions. In turn, each job is converted into a representation written in a page description language (PDL) such as PostScript ® containing the image data. Where the PDL of the incoming image data is different from the PDL used by the digital printing system, a suitable conversion unit converts the incoming PDL to the PDL used by the digital printing system. The suitable conversion unit may be located in an interface unit **52** in the controller **50**. Other remote sources of image data such as a floppy disk, hard disk, storage medium, scanner, etc. may be envisioned.

For on-site image input, an operator may use the scanner **64** to scan documents, which provides digital image data including pixels to the interface unit **52**. Whether digital image data is received from scanner **64** or computer network **62**, the interface unit **52** processes the digital image data in the form required to carry out each programmed job. The interface unit **52** is preferably part of the digital printing system **10**. However, the components in the computer network **62** or the scanner **64** may share the function of

converting the digital image data into a form, which can be unutilized by the digital printing system **10**.

As indicated previously, the digital printing system **10** includes feeders **20**, print engine **30**, finishers **40** and controller **50**. Each feeder **20** preferably includes one or more trays **22**, which forward different types of support material to the print engine **30**. All of the feeders **20** in the digital printing system **10** are collectively referred to as a supply unit **25**. All of the finishers **40** are collectively referred to as an output unit **45**. The output unit **45** may comprise several types of finishers **40** such as inserters, stackers, staplers, binders, etc., which take the completed pages from the print engine and use them to provide a finished product.

The controller **50** controls and monitors the entire digital printing system **10** and interfaces with both on-site and remote input units in the image input section **60**. The controller **50** includes the interface unit **52**, a system control unit **54**, a memory **56** and a user interface **58**. The user interface **58** includes an area holding a graphic representation or picture of the feeders **20**, print engine **30** and finishers of the digital printing system **10**. The user interface **58** permits an operator to monitor the document feeders **20**, print engine **30** and finishers **40** by navigating through a series of menus by clicking on a section of the graphical representation of the user interface **58** to reach controls or information related to that component of the digital printing system **10**. Therefore, a user (also called an operator) can associate tasks done on the user interface **58** with their physical location on the digital printing system **10** and thereby enable faster and more intuitive navigation. The user interface **58** preferably includes a display screen **53**, a keyboard **55** and a mouse **57** as shown in **Figure 3**.

Figures 4 shows a graphical representation displayed on a display screen **59**, which is used to reach controls or information related to components or supplies in the digital printing system **10**, as taught by

copending application Attorney Docket Number D/98736, U.S. Patent Application Serial No. ----------, filed ----------, entitled, "USER INTERFACE FOR NAVIGATION AND CONTROL OF A PRINTING SYSTEM". **Figure 4** shows a printer status window **70** having a printer icon **72** including feeder icons **A-D**, print engine icon **E**, and finisher icons **F-J**. However, as indicated above, feeder icons and finisher icons can be added or removed so that the printer icon **72** is an accurate depiction of the printing system actually being used by the operator. The printer status window **70** also includes a job progress meter **74**, which continuously informs the operator of the total time required to complete a print job (e.g. 33 minutes), the time that has elapsed since the print job began (e.g. 28 minutes) and the time remaining (7 minutes). This enables the operator to make choices as to whether to stop or suspend the current job in order to process a higher priority job.

Figure 4 also shows a pathway access window **76**, which also provides access to information and control of the digital printing system **10**. For example, by highlighting and clicking on the diagnostic icon, customer service information, location of faults along the paper path, etc. are displayed on display screen **59**. By highlighting and clicking on the tool icon, the operator can establish preferences such as the type of screen saver to be displayed on the display screen **59** and access power management tools to power down the digital printing system . The operator can also associate the addition or removal of modules such as a feeder **20** to the digital printing system **10**. By highlighting and clicking on the administrative icon, this provides information on the users, job accounting and billing of jobs.

By highlighting and then clicking on the print engine icon **E** of the printer status window **70** or by clicking on the print engine icon/button of the pathway access window **76**, print engine information **78** is displayed as shown in **Figure 5**. The print engine information is a summary of the current amount of consumables such as toner as well as the current magnification,

registration and color curve settings. By clicking on consumables, more detailed consumable information **80** regarding the current toner levels in the print engine **30** are displayed as shown in **Figure 6**. This window shows the user the current toner levels and the amount needed by each job in the print ready queue. The system alerts the user that it will run out of toner if all the jobs currently in the print ready queue combined require more toner than is currently available. Magenta is an example of this situation. An icon such as an exclamation point inside a triangle identifies the need for additional toner to complete the jobs in a print queue As can be seen from **Figure 6**, the consumable information **80** does indicate that additional magenta toner must be added to complete "ABC Corp. Proposal ..." print job. If additional magenta toner is not provided, then the digital printing system **10** skips the "ABC Corp. Proposal...." print job, and executes the next print job in the queue

Referring to **Figure 7**, by highlighting and clicking on the print queue icon, a depiction of the print queue **82**, showing a list of active print jobs is displayed on display screen **59**. A check mark icon displayed next to an active print job indicates that there are enough resources within the system to complete the print job. However, if an icon such as the exclamation point inside a triangle is displayed next to an active print job, then this notifies the operator that there are insufficient resources to complete the print job. By clicking on an active print job in the print queue list **59**, a window, showing print job information from which required stock information **84**, required finishing information **86** and required resources information **88** can be accessed, is displayed on display screen **59** (**Figures 8** through **11**).

Figure 8 shows a list of stocks, and their associated attributes required for the job. Attributes can include: quantity, size, color, type, weight, ordered, and prefinished. Additionally, if a tray within the machine currently contains a required stock, it is also displayed below the stock. An operator can scroll through this list to see which of the required stocks is not

programmed in the machine or requires replenishment. Both the available stock (current amount of stock in trays) and the required amount of stock are displayed.

Figures 9-10 show the available (current) and required finishing materials for finishing units **20**. This finishing information **86** depends upon the types of finishing units **20** in the digital printing system **10**. For example, if an inserter is required for the print job, then the number of required sheets and other pertinent information would be shown. If a stapler was needed to complete the print job, the number of staples would be part of the information displayed. If a binder was needed to complete the print job, the type and required amount of binder wire would be part of the information displayed. If a stacker is required to complete the print job, the required stack offset settings would be displayed.

Figure 11 shows the available (current) and required resources for the print engine **30** such as toner or fuser oil. The operator recognizes how much additional toner or fuser oil may be required by comparing the present levels within the system with the requirements of that particular job.

Figures 12 and **13** are flow charts showing the resource management process, which notifies the operator that there is insufficient information to complete a particular print job. Each RIPed job is placed in a print queue A RIPed job is a job that has been Raster Image Processed into a print ready format. However, any method of placing image data in a print ready format is acceptable. In small printing systems, where there may only be one feeder **20** having one or two trays, there may not be enough space to store different types of support material to complete many large jobs requested by clients. Therefore, the operator must supply additional support material or different support material several times to complete just one print job. In these cases, the job auto-management is disabled because continuous operation of the printer to complete a job is not possible. Instead, the controller **50** will check whether the resources are available to continue the print job. If the

resources are available, the digital printing system **10** prints the job. However, if the controller **50** determines that the resources are no longer available, the controller **50** by way of the user interface **58** notifies the operator that there is a job fault and that additional support material is needed to complete the print job. Once the additional support material is provided, then the digital printing system **10** continues to print the job. However, the need for additional support material is just one example of the types of resources being detected. The controller **50** is also determining whether all of the other resources required to finish a print job, such as toner, are available. If any one of the resources is unavailable, the controller **50** notifies the operator by way of user interface **58**.

In large printing systems where there are many feeders **20** and finishing units **40** to complete many large print jobs, the auto-management is enabled. The controller **50** examines each job ticket in the print queue to determine the resources required to complete each job. The controller **50** prompts all modules (feeders **20**, print engine **30** and finishers **40**) for status information, and the modules sends sensor information (sensor data) concerning the resources used in the module back to the controller **50**. For each print job, the controller **50** subtracts the resources used by other print jobs having a higher priority in the print queue from the total amount of resources available. If the resources are available, then the controller **50** by way of the user interface **58** notifies the operator on the display screen **59** that the resources to print the job are available. For example, in **Figure 7**, a check mark indicates that the resources are available to print the job. However, any icon may be used.

If the controller **50** determines that the resources necessary to complete a print job are unavailable, then the job is put on hold due to resource unavailability. The controller **50** by way of the user interface **58** notifies the operator on the display screen **59** that the resources to print the job are unavailable. The system would then skip to the next job. For example,

in **Figure 7**, an exclamation point inside a triangle indicates that the resources are available to print the job. However, any icon may be used. By highlighting and clicking on the job ticket window as shown in **Figures 7-11**, the operator can determine which resources are need to be added so that the print job can be completed. If the resource needed is additional toner, then this can be seen by accessing the print engine information as shown in **Figure 6**. Once the operator loads more resources so that the print job can be completed, an icon such as the check mark will then replace the insufficient resources icon (e.g., exclamation point inside a triangle) on the dipole screen **59** to show the operator that the print job can now be completed. Then, the print job waits for its turn in the queue to print and thereafter completed.

Figure 14 is a partial schematic view of a digital printing system, such as the digital imaging system of U. S. Application Serial No. 09/318,953, utilizing the navigation and control user interface of the present invention. U.S. Application Serial No. 09/318,953 is incorporated by reference. The imaging system is used to produce color output in a single pass of a photoreceptor belt. It will be understood, however, that it is not intended to limit the invention to the embodiment disclosed. On the contrary, it is intended to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims, including a multiple pass color process system, a single or multiple pass highlight color system and a black and white printing system. The present invention is applicable to a printing system having a print engine with any number of developer housings.

In one embodiment, an original document can be positioned in a document handler **110** on a raster-input scanner (RIS) indicated generally by reference numeral **112**. However, as shown in **Figure 2**, any scanner **64** can be utilized. The RIS **112** capture the entire original document and converts it to a series of raster scan lines or image signals. This information is

transmitted to an electronic subsystem (ESS) or system controller **54** by way of interface unit **52**. System controller **54** includes a pixel counter, and is connected to a user interface **58**. Alternatively, image signals may be supplied by a computer network **62** by way of interface unit **52**.

The print engine preferably uses a charge retentive surface in the form of an Active Matrix (AMAT) photoreceptor belt **150** supported for movement in the direction indicated by arrow **152**, for advancing sequentially through the various xerographic process stations. The photoreceptor belt **150** is entrained about a drive roller **154**, tension rollers **156** and fixed roller **158** and the drive roller **154** is operatively connected to a drive motor **160** for effecting movement of the photoreceptor belt **150** through the xerographic stations. A portion of photoreceptor belt **150** passes through charging station **A** where a corona generating device, indicated generally by the reference numeral **162**, charges the photoconductive surface of photoreceptor belt **150** to a relatively high, substantially uniform, preferably negative potential.

Next, the charged portion of photoconductive surface is advanced through an imaging/exposure station **B**. At imaging/exposure station **B**, the system controller **54** receives the image signals from raster input scanner **66** by way of the interface unit **52**. The image signals represent the desired output image. The system controller **54** processes these signals to convert them to the various color separations of the image which is transmitted to a laser based output scanning device, which causes the charge retentive surface to be discharged in accordance with the output from the scanning device. Preferably the laser based scanning device is a laser Raster Output Scanner (ROS) **164**. Alternatively, the ROS **164** could be replaced by other xerographic exposure devices such as LED arrays. A computer network **62** may also transmit image signals to the system controller **54** by way of the interface unit **52**.

The photoreceptor belt **150**, which is initially charged to a voltage V_0, undergoes dark decay to a level equal to about -500 volts. When exposed at the exposure station **B**, it is discharged to a level equal to about -50 volts. Thus after exposure, the photoreceptor belt **150** contains a monopolar voltage profile of high and low voltages, the former corresponding to charged areas and the latter corresponding to discharged or background areas.

At a first development station **C**, developer structure, indicated generally by the reference numeral **166** utilizing a hybrid development system, the development roll, better known as the donor roll, is powered by two development fields (potentials across an air gap). The first field is the ac field which is used for toner cloud generation. The second field is the dc development field which is used to control the amount of developed toner mass on the photoreceptor belt **150**. Preferably, the developer structure **166** contains magenta toner particles **168**. The toner cloud causes charged magenta toner particles **168** to be attracted to the electrostatic latent image. Appropriate developer biasing is accomplished via a power supply. This type of system is a noncontact type in which only toner particles (magenta, for example) are attracted to the latent image and there is no mechanical contact between the photoreceptor belt **150** and a toner delivery device to disturb a previously developed, but unfixed, image. A toner concentration sensor **170** senses the toner concentration in the developer structure **166**. A toner dispenser **190** adds new toner particles **168** to increase the toner concentration in the developer structure **166** at developer station **C**. The developed but unfixed image is then transported past a second charging device **180** where the photoreceptor belt **150** and previously developed toner image areas are recharged to a predetermined level.

A second exposure/imaging is performed by device **182**. Device **182** preferably comprises a laser based output structure and is preferably utilized for selectively discharging the photoreceptor belt **150** on toned areas and/or bare areas, pursuant to the image to be developed with the second color

toner. Device **182** may be a raster output scanner or LED window. At this point, the photoreceptor belt **150** contains toned and untoned areas at relatively high voltage levels and toned and untoned areas at relatively low voltage levels. These low voltage areas represent image areas which are developed using discharged area development (DAD). To this end, a negatively charged, developer material **184** comprising color toner, preferably yellow, is employed. The toner, which by way of example may be yellow, is contained in a developer structure **166** disposed at a second developer station **D** and is presented to the latent images on the photoreceptor belt **150** by way of a second developer system. A power supply (not shown) serves to electrically bias the developer structure 166 to a level effective to develop the discharged image areas with negatively charged yellow toner particles **184**. Further, a toner concentration sensor **170** senses the toner concentration in the developer structure **166**. A toner dispenser **190** adds new toner particles **184** to increase the concentration in the developer structure **166** at developer station **D**.

The above procedure is repeated for a third image for a third suitable color toner such as cyan **186** (station **E**) and for a fourth image and suitable color toner such as black **188** (station **F**). The exposure control scheme described below may be utilized for these subsequent imaging steps. In this manner a full color composite toner image is developed on the photoreceptor belt **150**. In addition, a permeability sensor **200** measures developed mass per unit area. Although only one mass sensor **200** is shown in **Figure 1**, there may be more than one mass sensor **200**.

To the extent to which some toner charge is totally neutralized, or the polarity reversed, thereby causing the composite image developed on the photoreceptor belt **150** to consist of both positive and negative toner, a negative pre-transfer dicorotron member **214** is provided to condition all of the toner for effective transfer to a substrate using positive corona discharge.

Subsequent to image development a sheet of support material **212** from supply unit **25** is moved into contact with the toner images at transfer station **G**. The sheet of support material **212** is advanced to transfer station **G** by the supply unit **25**. The sheet of support material **212** is then brought into contact with photoconductive surface of photoreceptor belt **150** in a timed sequence so that the toner powder image developed thereon contacts the advancing sheet of support material **212** at transfer station **G**.

Transfer station **G** includes a transfer dicorotron **214** which sprays positive ions onto the backside of support material **212**. This attracts the negatively charged toner powder images from the photoreceptor belt **150** to sheet **212**. A detack dicorotron **216** is provided for facilitating stripping of the sheets from the photoreceptor belt **150**.

After transfer, the sheet of support material **212** continues to move, in the direction of arrow **218**, onto a conveyor (not shown) which advances the sheet to fusing station **H**. Fusing station **H** includes a fuser assembly, indicated generally by the reference numeral **220**, which permanently affixes the transferred powder image to sheet **212**. Preferably, fuser assembly **220** comprises a heated fuser roller **222** and a backup or pressure roller **224**. Sheet **212** passes between fuser roller **222** and backup roller **224** with the toner powder image contacting fuser roller **222**. In this manner, the toner powder images are permanently affixed to sheet **212**. After fusing, a chute, not shown, guides the advancing sheets **212** to the output unit **45**, which includes one or more finishers **40** such as a catch tray, stacker, binder, stapler or other output device, for subsequent removal from the printing system by the operator.

After the sheet of support material **212** is separated from photoconductive surface of photoreceptor belt **150**, the residual toner particles carried by the non-image areas on the photoconductive surface are removed therefrom. These particles are removed at cleaning station **I**,

preferably using a cleaning brush or plural brush structure contained in a housing **230**. The cleaning brush **240** or brushes **240** are engaged after the composite toner image is transferred to a sheet. Once the photoreceptor belt **150** is cleaned the brushes **240** are retracted utilizing a device incorporating a clutch (not shown) so that the next imaging and development cycle can begin.

System controller **54** regulates the various printer functions. The system controller **54** is preferably a programmable controller, which controls printer functions hereinbefore described. The system controller **54** may provide a comparison count of the copy sheets, the number of documents being recirculated, the number of copy sheets selected by the operator, time delays, jam corrections, etc. The control of all of the exemplary systems heretofore described may be accomplished by conventional control switch inputs from the printing machine consoles selected by an operator. Conventional sheet path sensors or switches may be utilized to keep track of the position of the document and the copy sheets.

While the **Figures** show one example of a printing system incorporating the user interface navigation and control system of the present invention, it is understood that this process could be used in any printing system. Further, it also understood that a window can be actuated by an operator and displayed on the display screen **59** by pointing a cursor at an icon and clicking on the icon, pointing a cursor and double-clicking on the icon, and highlighting the icon and then clicking on the icon. However, actuating a window is not limited to the above three methods. It is understood that any method of opening a window can be utilized.

While the invention has been described in detail with reference to specific and preferred embodiments, it will be appreciated that various modifications and variations will be apparent to the artisan. All such modifications and embodiments as may occur to one skilled in the art are intended to be within the scope of the appended claims.